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GUEST EDITORIAL

Value of Laparoscopic Staging for Upper Gastrointestinal Malignancies

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As multimodality management of upper gastrointestinal cancer continues to evolve, the importance of accurate preoperative staging becomes apparent. The value of any preoperative staging modality is defined in terms of its ability to define accurately the extent of disease, direct appropriate therapy, and avoid unnecessary intervention in a cost-efficient manner. Considerable controversy exists as to how well laparoscopy meets such a definition.

Since its reintroduction into the surgical armamentarium, laparoscopy has been increasingly utilized to stage gastrointestinal malignancies. Proponents suggest that laparoscopic staging can assess the stage of the primary tumor, identify hepatic metastases, diagnose regional nodal metastases, and detect small-volume peritoneal disease unappreciated by other currently available noninvasive staging modalities such as computerized tomography, magnetic resonance imaging, or endoscopic ultrasound. In theory, avoidance of unnecessary open operations should translate to decreased perioperative morbidity and mortality, shorter hospitalization, reduced time to therapy, improved quality of life, and decreased financial cost.

However, many surgeons feel that the value of laparoscopy in upper gastrointestinal cancer is overstated, being applicable to only a small percentage of patients. Confining the question to the determination of resectability (a somewhat variable term), it is argued, fails to account for patients who require an open operation for palliative purposes and thereby inflates the usefulness of laparoscopy in this setting.

If any group of patients should benefit from improved staging and a more rational approach to therapy, it is those with pancreatic adenocarcinoma. Despite advances in perioperative management, surgical techniques, and development of multimodality therapy, pancreatic cancer remains a lethal disease. Approximately 27,000 new cases of pancreatic adenocarcinoma are reported each year in the United States. Unfortunately, most of these patients present with an advanced stage of the disease. Surgical resection offers the only chance for long-term survival. However, this approach is applicable for less than 20% of patients, as the remainder have extrapancreatic disease, such as occult peritoneal or hepatic metastasis, which precludes curative resection [1,2].

Dynamic, contrast-enhanced, helical or spiral computed tomography (CT) is the radiographic study of choice in the preoperative evaluation of patients with pancreatic cancer [2]. However, despite this advanced imaging modality, many patients will still undergo a staging laparotomy without resection [1,2]. In these patients, whose median survival is limited, an exploratory operation may be associated with significant perioperative morbidity, potential mortality, and diminished quality of life [3]. In addition, the development of nonoperative techniques for relieving both biliary and gastric obstruction has reduced the need for operation in this patient population.

Recent studies from North America and Europe have suggested that laparoscopy can prevent unnecessary operations in this patient population, with the incremental benefit over conventional preoperative staging modalities in determining resectability of approximately 15%–20% [4–8]. In a report from our institution, we demonstrated that multiport laparoscopic staging in conjunction with dynamic, contrast-enhanced, helical CT scanning had an overall accuracy of 94% in determining resectability [4]. Patients undergoing laparoscopic staging alone for unresectable disease had a significantly reduced median hospital stay of 2 days compared to those undergoing open exploration (7 days), biliary bypass (9.5 days), or gastric and biliary bypass (12 days). This study suggested that not only the resectability rate improved

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but that there may be an economic benefit associated with this improvement. In order to assess the economic impact of introducing laparoscopic staging at our institution, we recently completed a prospective study that compared hospital charges for patients who underwent a laparoscopic procedure whether or not they had a subsequent open operation to a group of patients who underwent an open operation alone. Overall charges were 25% lower in the laparoscopic group (data not shown), which is similar to retrospective studies from other centers in the United States and Europe [9,10]. In contrast, some authors have argued that even if the percentage of patients who would benefit from laparoscopic staging is in the range of 10%–20%, this incremental yield over existing state-of-the-art radiology is limited and thus intuitively not a cost-effective utilization of available resources [11].

In addition, the concept that laparoscopic staging truly alters surgical practice has been vigorously questioned. Critics have argued that inoperable disease secondary to local extension and vascular encasement can best be determined by celiotomy [12]. Others have noted that as there are few patients who do not require an operation either for resection or biliary/gastric bypass, the impact of laparoscopy in avoiding an operation is limited [13,14]. Despite these concerns, our experience is that the introduction of laparoscopic staging has indeed significantly altered both the requirement for open surgery and the type of procedure performed. Prior to the introduction of laparoscopic staging (1983–1992) at Memorial Sloan-Kettering Cancer Center, 1,135 patients with potentially resectable disease were explored and only 35% resected. Between 1993–1996, laparoscopy was attempted in 243 patients with "radiologically" resectable disease, 185 of whom were subsequently explored and 74% resected [15]. In conjunction with laparoscopic staging, we are aggressive in utilizing endoscopic or percutaneous biliary stenting for unresectable patients with jaundice with laparotomy in the main reserved for gastroduodenal obstruction. Our experience suggests that this strategy fails due to the requirement of subsequent laparotomy in only a small percentage of patients (< 5%) [16]. It is fair to say, however, that questions remain as to the selection of patients for endoscopic staging. One could plausibly argue whether patients with locally advanced disease who would be expected to have a relatively extended survival would be better served by surgical (either open or laparoscopic) palliation. It may well be that one of the values of laparoscopic staging is that it leads to a reevaluation of operative vs. endoscopic palliation for biliary obstruction.

While it has been argued that the ability of laparoscopic staging to avoid unnecessary exploration defines its applicability for patients with pancreatic cancer, the issue is less well defined in gastric cancer. Historically, the majority of patients with gastric cancer has undergone some form of surgical resection or bypass regardless of the extent of their disease. However, as patients are offered choices between surgical resection, investigational neoadjuvant chemotherapy, palliative chemotherapy, or nonsurgical palliation, the need for accurate preoperative staging becomes evident.

The role of preoperative staging has taken on crucial significance in the multimodality management of gastric cancer. Currently, as with pancreatic cancer, dynamic, contrast-enhanced, helical CT scanning is the most commonly utilized radiological investigation for pretherapeutic staging. However, following CT scanning, up to one-third of patients will be found to have been understaged at subsequent laparotomy. The preoperative diagnosis of occult intra-abdominal M1 disease undetected by standard radiological methods has enormous implications for treatment and quality-of-life decisions. In the absence of bleeding and/or obstruction, the patient with stage IV disease need not be resected. Preoperative identification of peritoneal or intra-abdominal metastatic disease would avoid unnecessary operation in this group of patients. Additionally, our institutional bias is that patients with locally advanced disease (stage III) are at high risk for local failure and should be considered for neoadjuvant investigational trials. As a result, we believe that laparoscopy is indicated for the majority of nonobstructed, nonbleeding patients with gastric cancer. The risk of disseminated disease is low for those with early (T1 or T2) tumors, and these patients should proceed to laparotomy.

As is the case with its application in pancreatic cancer, the efficacy of laparoscopic staging in gastric cancer has not been tested in a prospective randomized trial format; however, a number of recent clinical series have been reported that clarify its role.

Lowy et al. [17] from the M.D. Anderson Cancer Center reported a series of 69 patients with radiologically localized disease that underwent laparoscopy prior to operation. Distant metastatic disease was noted in 16 (23%) patients. Only one patient subsequently required operation for palliation. The combination of CT plus laparoscopic staging resulted in a 93% resectability rate for patients operated on for curative intent. Our recent experience is similar [18]; laparoscopic staging demonstrated metastatic disease in 37% of patients considered to have localized gastric cancer by preoperative studies. It is of interest that no patient undergoing a laparoscopic procedure alone required a subsequent laparotomy for palliative purposes. Other studies have confirmed these results. Overall, laparoscopic staging identifies metastatic disease in approximately 25%–40% of patients with supposedly localized disease and results in resectability rates in excess of 90% [19,20].

In addition to defining resectability, laparoscopic staging has also identified a subgroup of patients with mini-

mal peritoneal disease (stage IV) that may benefit from newer inductional chemotherapeutic approaches while avoiding the initial laparotomy. If these patients demonstrate a clinical response, they are candidates for further restaging and possible resection. Preliminary experience with this approach has been hopeful, but further data are required.

In summary, experience to date suggests that laparoscopy has added value in the staging of patients with potentially resectable gastric and pancreatic cancer. As a staging modality, it appears to be a safe, effective, and cost-effective means of directing appropriate therapy and avoiding unnecessary exploration. Indeed, the use of laparoscopic staging for both diseases has resulted in the reexamination of traditional management paradigms for patients with advanced disease. Data in both diseases are now emerging to suggest that the traditional approaches to operative palliation may not be warranted with patients adequately palliated by nonoperative means.

While an increasing body of literature now exists, further experience is required to define the long-term risks of the procedure, particularly in relation to the dissemination of disease (i.e., port site implantation). In addition, the role and value of associated modalities such as laparoscopic ultrasonography remains to be clarified. Ongoing prospective studies will help answer these questions.

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